

PERFORATED DUODENUM – AN UNUSUAL ETIOLOGY OF FOURNIER'S DISEASE: A CASE REPORT

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Fournier's disease, a form of necrotizing fasciitis, is a rapidly progressing subcutaneous infection of the male genitalia. We report a case of Fournier's disease with the unusual etiology of a perforated duodenum. This patient suffered from progressive right scrotal swelling after percutaneous transhepatic cholangial drainage. Scrotal exploration revealed a large abscess with muscle necrosis that had spread up to the right retroperitoneal space. Radiologic studies and second abdominal exploration documented the origin as a perforated duodenum. The pus distribution in this case suggested that the infection process differed from that in previous reports. In future cases of Fournier's disease involving previous abdominal events, we recommend that abdominal origins be carefully surveyed before scrotal exploration.

Key Words: duodenum perforation, Fournier's disease
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Fournier's disease was initially described as an idiopathic rapidly progressing necrotizing fasciitis of the scrotum [1]. An etiologic cause is now recognized in approximately 95% of cases [2]. We report a case of Fournier's disease that had the unusual etiology of a perforated duodenum. To our knowledge, few reports have described how abdominal infections can extend into the scrotum, and why the scrotal abscess in this case would be unilateral. In this article, we offer some observations about these issues.

CASE PRESENTATION

A 74-year-old male was transferred to the emergency room with the symptom of right scrotal swelling for several days.

Three weeks before this presentation, he had been diagnosed with pancreatic head cancer and had undergone percutaneous transhepatic cholangial drainage (PTCD) for obstructive jaundice. Unfortunately, he suffered from epigastralgia on the third day after PTCD. Right lower abdominal discomfort developed, followed by progressive right scrotal swelling with fever and chills.

Physical examination showed stable vital signs. The abdomen was soft and flat without tenderness. The left scrotum was normal with an intact testis. There was painful swelling with pus discharge in the right scrotal area. The skin of the right scrotum was erythematous with local heat that had extended up to the right inguinal area. However, no penile lesion was identified. Rectal and prostate examinations revealed no abnormalities. Significant laboratory data included a leukocyte count of 27,100 cells/ μ L and serum C-reactive protein concentration of 36.5 mg/L. Urinalysis revealed 5 to 8 white blood cells and 3 to 5 red blood cells per high-power field.

Under the impression of Fournier's disease, emergency debridement was performed. During the operation, a large amount of pus was found inside the incised right scrotum that contained the gangrenous testicle. Muscle necrosis

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with pus had spread along the obliterated inguinal canal up to the retroperitoneal space.

Abdominal computerized tomography (CT) revealed an abscess occupying both the anterior and posterior pararenal spaces, but the perirenal space appeared to be free of pus accumulation. A perforated duodenum penetrated by the PTC tube was suspected (Figure 1). Cholangiography subsequently documented retroperitoneal extravasation from the tip of the PTC tube (Figure 2). A second abdominal exploration proved this suspicion to be true. The wound was then left open and broad-spectrum intravenous antibiotics were given. Despite treatment, the patient died from pneumonia with sepsis.

DISCUSSION

Three common mechanisms have been well documented for scrotal abscess associated with Fournier's disease, namely, whether it is cutaneous, urethral, or rectal in origin [3–5]. Regardless of the infectious mechanisms, the purulent dissection in the involved scrotum is mainly beneath the dartos fascia, with the scrotum usually involved bilaterally. However, the testicles are usually unaffected in this fulminant infection because the associated blood supply is separate from that of the scrotum [1].

To the best of our knowledge, we are the first to report a case of Fournier's disease caused by a perforated

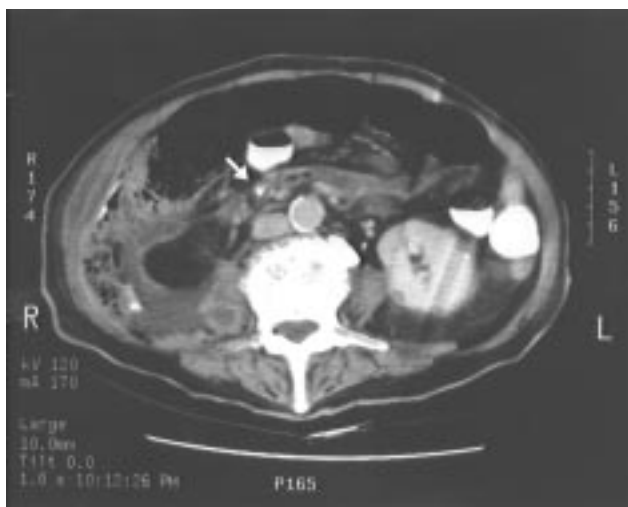


Figure 1. Abdominal computerized tomography scan reveals a large abscess accumulating in the right pararenal space. Percutaneous transhepatic cholangial drainage tube penetration of the duodenum is suspected (arrow).



Figure 2. Cholangiography reveals dilatation of the common bile duct and retroperitoneal extravasations (short arrows) from the tip of the percutaneous transhepatic cholangial drainage tube (long arrow).

duodenum. Several unusual findings can be observed in this case. First, the scrotal abscess was unilateral. Second, the involved testicle was gangrenous. More importantly, the pus was distributed within the retroperitoneal space. The purulent extension did not cross to the contralateral side despite inferior and lateral spread. It extended into the scrotum along the inguinal canal instead of accumulating in the layer of the dartos fascia. These unusual findings suggest that Fournier's disease caused by a perforated duodenum has a different progression route from that in previous reports.

Some physicians have observed that the air produced by operating in the retroperitoneal space might travel through the inguinal canal to the scrotum. Stevenson and Ozeran reviewed various etiologies of retroperitoneal abscesses and found that perforations of the abdominal viscera were the most common causes, with 90% of cases having unilateral pus extension [6]. By injecting gas into the selectively perforated organs, Meyers also observed that gaseous extension in the retroperitoneal space was generally confined to one side despite the space being potentially continuous across the midline [7]. These



Figure 3. Proposed route of Fournier's disease originating from the perforated duodenum. The scrotal abscess that originates from the perforated duodenum (→) should pass through the inguinal canal and occur within the spermatic fasciae. Infections from cutaneous, urethral, or rectal origins (↔) usually extend along the symmetrically continuous fascial layer (Scarpa's fascia, dartos fascia, and Colles' fascia).

results are in concordance with another roentgenographic-anatomic study [8]. Cope and Buhler first described autopsy and surgical specimen findings for scrotal abscesses that possibly originated from retroperitoneal infection. They found that this inflammatory process followed along the cord and involved all layers of the spermatic fascias. However, it was confined within the limits of the external spermatic fascia [9].

The external spermatic fascia is derived from the external abdomen oblique fascia, which remains firmly attached to the borders of the external inguinal ring. The three layers of the spermatic fascias, including the external spermatic fascia, form a sheath about the cord and envelop the bilateral testicles separately in the scrotum. A scrotal abscess from the retroperitoneal space could travel through the inguinal canal and theoretically confine itself within this fascial boundary. Therefore, the abscess should primarily be confined within the unilateral hemiscrotum unless the spermatic fascias are destroyed.

In this case, the fascial planes could not be individually distinguished due to severe infection. However, according to the surgical findings, the unilateral characterization and the spread of the abscess seemed to fit logically with the above inferences. With this understanding, we think that the pus from the perforated duodenum initially collected within the anterior pararenal space and then extended medially along the psoas muscle. When the purulent dissection progressed inferiorly below the apex of the perirenal space, it was further divided into two extensions. One superiorly extended to the posterior pararenal space and the other inferiorly progressed to the pelvic space, reaching the inguinal canal. Since the testicular blood supply originates from the retroperitoneal space and travels with the spermatic cord, the abscess had direct contact with the associated blood supply. In this situation, local consumption of oxygen by aerobes is compounded by the decreased vascular supply secondary to edema and inflammation. This may be why the involved testicle was gangrenous.

This proposed route is shown in Figure 3. We think that there is adequate anatomic basis for such an extension but do not offer this as the only etiologic mechanism. In future cases of Fournier's disease following previous abdominal events (especially with unilateral scrotal involvement), careful survey of the abdominal origins should be considered before scrotal exploration.

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